IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Simonian *et al.* | Art Unit: 1762

Serial No.: 10/713,671 | Examiner: Talbot, Brian

Filed: 22 May 2003 | Docket No.: TI-62963

For: SURFACE PROCESSES IN FABRICATIONS OF MICROSTRUCTURES

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

9 December 2007

Mails Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Dear Sir:

The following Appeal Brief is respectfully submitted in connection with the above-identified application in response to the Final Rejection mailed 8 February 2007, and the Advisory Action mailed 8 August 2007. Please charge all required fees, including any extension of time fees, to the deposit account of Texas Instruments Incorporated, Deposit Account No. 20-0668.

REAL PARTY IN INTEREST

The real party in interest is Texas Instruments Incorporated, to whom this application is assigned.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences known to the Applicant's legal representative.

STATUS OF THE CLAIMS

Claims 1-6, 8-39, 43, 44, and 84-89 are pending and are the subject of this appeal. Claims 45-64 hereby are withdrawn. Claims 7, 40-42, and 65-83 previously have been canceled.

STATUS OF THE AMENDMENTS

An amendment after final rejection was submitted on 7 May 2007 and amended Claim 1. The advisory action dated 16 May 2007 failed to indicate whether the amendment was entered or not entered.

The amendment after final stated two places that Claim 1 was amended, but the status indicator for Claim 1 incorrectly stated "previously presented." The only amendment to the claim was a change from a period to a semi-colon to correct a typographical error. It is unknown whether the Examiner recognized the amendment to Claim 1, or whether the incorrect status indicator led the Examiner to overlook the amendment to Claim 1. As the amendment simply corrected a typographical error—which clearly places the claim in a better condition for appeal—and as the Examiner did not indicate that the amendment would not be entered, it is assumed that the amendment was entered.

SUMMARY OF CLAIMED SUBJECT MATTER

Specification paragraphs 21, 22, and 40, in combination with Figures 5 and 6, provide a concise explanation of the invention defined by independent claims 1 and 85. Paragraph 21 teaches a cleaning process using "a cleaning agent, such as a gas mixture containing ozone, is applied to the surface to remove contaminants, such as organic residues on the surface. In an embodiment of the invention, the cleaning agent comprises

humid ozone gas and dry ozone gas. "Humid ozone gas", is a mixture of water vapor and ozone gas. "Dry ozone gas", is ozone gas without significant amounts of water vapor."

Specification paragraph 22 states, "The method of the present invention is particularly useful in altering partly enclosed surfaces, such as a surface of a microstructure in an assembly that comprises: a substrate with microstructures formed on its surface joined to another substrate to form a panel with a gap between the two substrates such that gas inside the panel can exchange with the gas outside the panel via a "micro-opening" having a characteristic dimension around 10 micrometers or less. Of course, the invention is applicable to microstructures without such micro-openings. The cleaning agent is applied onto the surface via the micro-opening. As an aspect of the invention, a pressure cycle is provided to expedite the cleaning process. The cleaning cycle comprises three steps: a) filling a first component of the cleaning agent into the chamber to a first pressure, b) filling the chamber with a second component of the cleaning agent to a second pressure that is higher than the first pressure and c) reducing the pressure inside the chamber to a third pressure that is lower than the first pressure. These steps can be repeated during the cleaning process as many times as necessary for cleaning to occur. The cleaning method is particularly useful for cleaning a surface located within an assembly that is not transmissive to ultra-violet light, for which standard UV/ozone cleaning techniques are not applicable."

Specification paragraph 40 states, "In order to efficiently clean the partly enclosed surfaces within the assembly, application of the gaseous cleaning agent is accomplished through one or more pressure cycles. Specifically, a first component of the cleaning agent, such as humid ozone gas, is introduced onto the partly enclosed surfaces through

the micro-opening such that the pressure inside the chamber containing the micromirror is at the first pressure value, preferably from 1 Torr to 2000 Torr. Then a second component of the cleaning agent, such as dry ozone gas, is introduced into the chamber and applied onto the surfaces through the micro-opening such that the pressure inside the chamber is at a second pressure that is higher than the first pressure value, preferably between 100 Torr and 5000 Torr."

In addition to the teachings of the specification referred to above, specification paragraphs 37-39 and 54, in combination with Figures 3, 5 and 6, provide a concise explanation of the invention defined by independent Claim 31. Claim 31 provides a method for introducing a modification agent—which could be a surface coating or a cleaning agent—into a micro-opening in a microelectromechancial device assembly.

Paragraph 37 recites, "Referring to FIG. 3, micromirror assembly 100 comprises two substrates 102 and 104. In this example, substrate 102 is glass that is transparent to visible light and not transparent to ultra-violet light. The micromirror array is formed on the glass substrate 102. Substrate 104 is a silicon wafer having one or more electrodes and circuitry that are associated with the micromirrors on substrate 102 for controlling the rotations of the micromirrors."

Paragraph 38 recites, "The packaging process begins with bonding the two substrates together using a selected bonding material 107. An exploded perspective view of the two substrates, with the bonding material applied to substrate 104, is illustrated in FIG. 4. Referring to FIG. 4, bonding material 107 is dispensed around the circumference of substrate 104. In this particular example, the bonding material is not a continuous line around the circumference of the device. Discontinuities in the dispensed bonding material

create micro-openings in the assembled device. The smaller dimension of a micro-opening is around 10 micrometers or less, or 5 micrometers or less. In other embodiments of the invention, the micro-openings may have a larger size, such as 10 micrometers or more. The bonding material may also be deposited on substrate 102, or on both of the substrates 102 and 104. During the bonding process, the bonding material can outgas or creep, and light organic components (e.g., solvents) will adsorb or diffuse onto the surfaces of the microstructure, creating a contaminated layer. As a result of the bonding, the micromirrors formed on substrate 102 and the electrodes and circuitry on substrate 104 are partly enclosed within the assembly of the substrates and the bonding material, as shown in FIG. 3."

Paragraph 39 recites, "Referring again to FIG. 3, assembly of the substrates creates micro-openings between the bonded substrates. These micro-openings allow for the cleaning agents to flow through and contact the partly enclosed surfaces of the micromirrors and substrates. The assembly is attached to package substrate 106, which is typically comprised of ceramic, and/or metal and/or glass. The package substrate may have other features, such as a built-in heater on or buried underneath the surfaces of the package."

Paragraph 54 describes the application of the method of Claim 31 to the coating process.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Whether Claims 1-6, 8-13, 15-18, 20, 23-30 and 84-89 are properly rejected as unpatentable under 35 U.S.C. § 103 (a) by Ashurst *et al.* "Wafer Level Anti-

Stiction Coating for MEMS" in combination with U.S. Patent No. 6,830,950 to Chinn *et al.* and U.S. Patent No. 7,045,170 to Hankins *et al.*

2. Whether Claims 26 and 27 are properly rejected as unpatentable under 35 U.S.C. § 103 (a) by Ashurst *et al.* "Wafer Level Anti-Stiction Coating for MEMS" in combination with U.S. Patent No. 6,830,950 to Chinn *et al.* and U.S. Patent No. 7,045,170 to Hankins *et al.* in further combination with U.S. Patent No. 5,512,374 to Wallace *et al.*

3. Whether Claims 31-39, 43 and 44 are properly rejected as unpatentable under 35 U.S.C. § 103 (a) by Ashurst *et al.* "Wafer Level Anti-Stiction Coating for MEMS" in combination with U.S. Patent No. 6,830,950 to Chinn *et al.* and U.S. Patent No. 7,045,170 to Hankins *et al.* and in further combination with U.S. Patent No. 6,951,769 to Malone ("Malone").

ARGUMENT

Ground of Rejection #1:

Claims 1-6, 8-13, 15-18, 20, 23-30 and 84-89 were rejected as unpatentable under 35 U.S.C. § 103 (a) by Ashurst *et al.* "Wafer Level Anti-Stiction Coating for MEMS" ("Ashurst") in combination with U.S. Patent No. 6,830,950 to Chinn *et al.* ("Chinn") and U.S. Patent No. 7,045,170 to Hankins *et al.* ("Hankins"). Claims 26 and 27, which depend from Claim 1, were rejected as unpatentable under 35 U.S.C. § 103 (a) by Ashurst in combination with Chinn and Hankins in further combination with U.S. Patent No. 5,512,374 to Wallace *et al.* ("Wallace").

"A person shall be entitled to a patent unless," creates an initial presumption of patentability in favor of the applicant. 35 U.S.C. § 102. "We think the precise language

of 35 U.S.C. § 102 that, 'a person shall be entitled to a patent unless,' concerning novelty and unobviousness, clearly places a burden of proof on the Patent Office which requires it to produce the factual basis for its rejection of an application under sections 102 and 103, see Graham and Adams." *In re Warner*, 379 F.2d 1011, 1016 (C.C.P.A. 1967) (referencing *Graham v. John Deere Co.*, 383 U.S. 1 (1966) and *United States v. Adams*, 383 U.S. 39 (1966)). "As adapted to *ex parte* procedure, *Graham* is interpreted as continuing to place the 'burden of proof on the Patent Office which requires it to produce the factual basis for its rejection of an application under sections 102 and 103'." *In re Piasecki*, 745 F.2d 1468 (Fed. Cir. 1984) (citing *In re Warner*, 379 F.2d at 1016).

"The *prima facie* case is a procedural tool which, as used in patent examination (as by courts in general), means not only that the evidence of the prior art would reasonably allow the conclusion the examiner seeks, but also that the prior art compels such a conclusion if the applicant produces no evidence or argument to rebut it." *In re Spada*, 911 F.2d 705, 708 n.3 (Fed. Cir. 1990).

"Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. As indicia of obviousness or nonobviousness, these inquiries may have relevancy." *Graham v. Deere*, 383 U.S. 1, 17-18 (1966).

"To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). 'All words in a claim must be considered in judging the patentability of that claim against the prior art.' *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970)." MPEP § 2143.03.

"To support the conclusion that the claimed combination is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed combination or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." *Ex parte Clapp*, 227 U.S.P.Q. 972, 973 (Bd. Pat. App. & Inter. 1985).

"'[R]ejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some rational underpinning to support the legal conclusion of obviousness.'" *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741 (2007) (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

The applicant respectfully submits the Examiner has failed to meet the duty of articulating a *prima facie* obviousness rejection.

Claim 1 recites, "loading a microelectromechanical device into a chamber; preparing a cleaning agent comprising ozone gas; and introducing the prepared cleaning agent into the chamber for cleaning a surface of the microelectromechanical device in the chamber" and "a) introducing a first component of the cleaning agent into the chamber such that the pressure inside the chamber is at a first pressure value; and b) introducing a

second component of the cleaning agent into the chamber such that the pressure inside the chamber is at a second pressure value that is higher than the first pressure value."

Claim 85 recites, "loading a microelectromechanical device into a chamber; introducing a first cleaning agent into the chamber for cleaning a surface of the microelectromechanical device in the chamber, wherein the chamber has a first pressure; and introducing a second cleaning agent into the chamber for cleaning the surface of the microelectromechanical device in the chamber, wherein the chamber has a second pressure that is different from the first pressure."

With respect to Claims 1 and 85, the Examiner stated, Ashurst "teaches applying dichlorodimethylsilane (DDMS) anti-stiction coating on MEMS devices (abstract). Silicon samples are rinsed in acetone and cleaned with UV and ozone (UVO), treated with HF and UVO cleaned again prior to depositing the DDMS coating thereon. The pressure is reduced to less than 10 mTorr for plasma UVO cleaning. Water gas is also utilized during the cleaning process. Next the chamber pressure is raised and DDMS is introduced to form the anti-stiction layer (pgs. 8-9). Hydrogen peroxide is also taught as a known cleaning agent for silicon surface prior to forming anti-stiction coating (pg. 4)."

The Examiner misapplies Ashurst. The Examiner stated, "Silicon samples are rinsed in acetone and cleaned with UV and ozone (UVO), treated with HF and UVO cleaned again prior to depositing the DDMS coating thereon."

The Examiner appears to be referring to the last paragraph of page 215 of Ashurst, in the section labeled "2. Experimental." The applicant respectfully submits that this section appears to be discussing the cleaning of a silicon wafer prior to the

fabrication of a microelectromechanical device, rather than cleaning the surface of a microelectromechanical device as recited by the independent Claims 1 and 85.

Next, the Examiner states, “The pressure is reduced to less than 10 mTorr for plasma UVO cleaning.” This statement appears to be wholly unsupported by Ashurst.

Ashurst states, in the first full paragraph of page 216, “First, the system is pumped down to a pressure of less than 10 mTorr. Then the samples are cleaned of any organic contamination that usually results from the CPD process by an in situ plasma cleaning. This is accomplished by first creating a background of oxygen (O_2) gas in the chamber by performing purge-pump cycles with O_2. Then, O_2 is admitted into the chamber so that the pressure of O_2 is about 300 mTorr. Next, a downstream plasma is struck by applying a dc bias (about 700 V) to the perforated electrodes.”

Thus, instead of teaching the “pressure is reduced to less than 10 mTorr for plasma UVO cleaning” as stated by the Examiner, Ashurst teaches performing a plasma O_2 cleaning step at 300 mTorr.

The Examiner further stated, “Water gas is also utilized during the cleaning process.” This statement also appears unsupported by Ashurst.

Ashurst teaches, at the end of the first full paragraph of page 216, “water gas is dosed into the chamber (about 500 mTorr) which, over time, effectively displaces the O_2. Exposure of silicon to a water plasma is known to leave the surfaces hydroxyl (-OH) terminated [34].”

Thus, instead of teaching the used of water gas to clean the micromechanical device surfaces, Ashurst appears to suggest the displacement of the cleaning agent by

water gas to treat the cleaned surface, leaving the cleaned surface terminated by a hydroxyl group.

The Examiner stated, "Next the chamber pressure is raised and DDMS is introduced to form the anti-stiction layer (pgs. 8-9)." The applicant respectfully submits, while the pressure is raised and DDMS is introduced, DDMS is not used to clean the surface as required by Claims 1 and 85, but rather to form the anti-stiction layer."

For the reasons stated above, the Examiner has not met the burden of presenting a *prima facie* case of obviousness. The Examiner has not shown how the teachings of Ashurst, Chinn and Hankins teach the limitations of Claims 1 and 85, or how the references expressly or impliedly suggest the claimed combination, presented a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references, but instead, based on a misreading of Ashurst, the Examiner merely offered conclusory statements of obviousness as prohibited by *In re Khan* and *KSR Int'l Co. v. Teleflex*. Therefore, the rejection under 35 U.S.C. § 103(a) is defective and should be withdrawn.

Claims 2-6, 8-13, 15-18, 20, 23-30 and 84 depend from Claim 1, and Claims 86-89 depend from Claim 85.

Section 2143.03 of the M.P.E.P. states, "If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

As the Examiner has failed to present a *prima facie* case of obviousness with respect to Claims 1 and 85, as argued above, Claims 2-6, 8-13, 15-18, 20, 23-30, and 86-89, which depend from Claims 1 and 85, should be deemed nonobvious.

Ground of Rejection #2:

Claims 26 and 27, which depend from Claim 1, were rejected as unpatentable under 35 U.S.C. § 103 (a) by Ashurst in combination with Chinn and Hankins in further combination with U.S. Patent No. 5,512,374 to Wallace *et al.* ("Wallace").

The applicant respectfully submits the Examiner has failed to meet the duty of articulating a *prima facie* obviousness rejection.

As argued above with respect to Claim 1, the Examiner has failed to articulate a *prima facie* obviousness rejection with respect to Ashurst, Chinn, and Hankins. The Examiner uses Malone for the teaching of a perfluoropolyether coating. The Examiner has not applied Malone in any manner that would render Claim 1 obvious in view of Ashurst, Chinn, Hankins, and Malone.

Section 2143.03 of the M.P.E.P. states, "If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

As the Examiner has failed to present a *prima facie* case of obviousness with respect to Claim 1, as argued above, Claims 26 and 27 which depend from Claim 1 should be deemed nonobvious.

Ground of Rejection #3:

Claims 31-39, 43 and 44 were rejected as unpatentable under 35 U.S.C. § 103 (a) by Ashurst in combination with Chinn and Hankins, and in further combination with U.S. Patent No. 6,951,769 to Malone ("Malone").

The applicant respectfully submits the Examiner has failed to meet the duty of articulating a *prima facie* obviousness rejection.

Claim 31 recites a method for modifying a surface of a microelectromechanical device that is assembled within an assembly. The method includes the limitation "wherein the micro-opening is between a first substrate and a second substrate that is glass having a reflective and deflectable mirror plate formed thereon; wherein the micro-opening has a characteristic dimension around 10 micrometers or less."

The Examiner stated Malone "teaches mounting MEMS devices on an assembly substrate and coupling an assembly lid to the assembly substrate and over the MEMS device to create an interior of the MEMS device. The MEMS device can be contacted through an opening (abstract and Figs.). Therefore it would have been obvious for one skilled in the art at the time the inventions was made to have modified Ashurst . . . in combination with Chinn . . . or Hankins . . . chamber to have placed the MEMS device in assembly for cleaning/coating as evidenced by Malone . . . with the expectation of achieving similar results."

The applicant respectfully submits the forgoing appears to be completely relying on hindsight gleaned from Claim 31. The reference in combination do not show or teach an assembly having a cavity with a micro-opening formed between a first substrate and a "second substrate that is glass having a reflective and deflectable mirror plate formed thereon" as recited by Claim 31. Malone teaches a MEMS device formed on a single substrate inside a package having a rather large cavity. While the opening (240 in Figure 2C of Malone) between the package substrate (205) and the package lid (225) may be considered a small opening—although no dimensions are given—the assembly of Claim 31, as shown in Figures 3 and 4 in which gaps in the bonding material (107) define the micro-opening is not similar to the Malone package cavity. The micro-opening and

assembly of Claim 31 is defined by the substrates recited in Claim 31 which requires "a second substrate that is glass having a reflective and deflectable mirror plate formed thereon." As the substrate of Malone on which deflectable mirror plates are formed does not form a portion of the package cavity, the two structures are substantially different and there is no indication that one of ordinary skill in the art would consider the two equivalent, or would be led by the teachings of Malone to employ a similar technique to modify the surfaces within a cavity formed by substrates as recited by Claim 31.

For the reasons stated above, the Examiner has not met the burden of presenting a *prima facie* case of obviousness. The Examiner has not shown how the teachings of Ashurst, Chinn, Hankins, and Malone teach the limitations of Claim 31, or how the references expressly or impliedly suggest the claimed combination, presented a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references, but instead, the Examiner merely offered conclusory statements of obviousness as prohibited by *In re Khan* and *KSR Int'l Co. v. Teleflex*. Therefore, the rejection under 35 U.S.C. § 103(a) is defective and should be withdrawn.

Claims 32-39, 43 and 44 depend from Claim 31. As the Examiner has failed to present a *prima facie* case of obviousness with respect to Claim 31, as argued above, Claims 32-39, 43 and 44, which depend from Claim 31, should be deemed nonobvious.

CONCLUSION

For the foregoing reasons, Appellants respectfully submit that the Examiner's final rejection of Claims 1-6, 8-13, 15-39, 43, 44, and 84-89 is improper, and it is

respectfully requested that the Board of Patent Appeals and Interferences so find and reverse the Examiner's rejection.

Please charge any fees necessary in connection with the filing of this paper, including any necessary extension of time fees, to Deposit Account No. 20-0668 of Texas Instruments Incorporated.

Respectfully submitted,

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CLAIMS APPENDIX

1. (previously presented) A method comprising:

loading a microelectromechanical device into a chamber;

preparing a cleaning agent comprising ozone gas; and

introducing the prepared cleaning agent into the chamber for cleaning a surface of the microelectromechanical device in the chamber, wherein the temperature of the chamber is between 100° C and 200° C; further comprising:

a) introducing a first component of the cleaning agent into the chamber such that the pressure inside the chamber is at a first pressure value; and

b) introducing a second component of the cleaning agent into the chamber such that the pressure inside the chamber is at a second pressure value that is higher than the first pressure value.

2. (previously presented) The method of claim 1, wherein the step of preparing the cleaning agent further comprises:

mixing ozone gas with an oxygen-containing co-agent that is water vapor.

3. (previously presented) The method of claim 1, wherein the step of preparing the cleaning agent further comprises:

mixing ozone gas with an oxygen-containing co-agent that is hydrogen peroxide vapor.

4. (previously presented) The method of claim 1, wherein the step of preparing the cleaning agent further comprises:

mixing ozone gas with an oxygen-containing co-agent that is acetic acid vapor.

5. (original) The method of claim 1, wherein the step of preparing the cleaning agent

further comprises:

mixing ozone gas with one or more oxygen-containing co-agents selected from a group comprising water vapor, hydrogen peroxide vapor and acetic acid vapor.

6. (original) The method of claim 1, wherein the temperature of the chamber is between 40 °C and 400° C.

7. (canceled)

8. (original) The method of claim 1, wherein the pressure inside the chamber is between 1 Torr and 5000 Torr.

9. (previously presented) The method of claim 1, further comprising:

after the step of introducing the prepared cleaning agent into the chamber, preparing a coating agent; and

introducing the coating agent into the chamber for coating the surface of the microelectromechanical device.

10. (previously presented) The method of claim 9, further comprising:

pumping out the chamber before introducing the coating agent into the chamber.

11. (previously presented) The method of claim 9, wherein the step of preparing the coating agent further comprises:

preparing the coating agent such that after introducing the agent into the chamber, the agent forms a coating layer that is chemically bonded to the surface of the microelectromechanical device.

12. (previously presented) The method of claim 9, wherein the step of preparing the coating agent further comprises:

preparing the coating agent such that after introducing the agent into the chamber,

the agent forms a coating layer that is physically adsorbed on the surface of the microelectromechanical device.

13. (previously presented) The method of claim 9, wherein the step of preparing the coating agent further comprises:

preparing the coating agent that comprises a first and second coating components such that after introducing the coating agent into the chamber, the first component of the coating agent forms a coating layer that is chemically bonded to the surface of the microelectromechanical device, and the second component of the coating agent forms another layer that is not chemically bonded to the surface of the microelectromechanical device.

14. (canceled)

15. (previously presented) The method of claim 1, wherein the first pressure is from 1 Torr to 700 Torr.

16. (previously presented) The method of claim 1, wherein the second pressure is from 10 Torr to 5000 Torr.

17. (previously presented) The method of claim 1, further comprising:

lowering the pressure inside the chamber to a pressure less than the first pressure value;

and

repeating the steps a) and b).

18. (previously presented) The method of claim 1, wherein the first component of the cleaning agent comprises ozone gas and water vapor.

19. (previously presented) The method of claim 1, wherein the second component of

the cleaning agent comprises ozone gas in the absence of water.

20. (previously presented) The method of claim 9, wherein the step of introducing the coating agent into the chamber further comprises:

a) introducing a first component of the coating agent into the chamber such that the pressure inside the chamber is at a first pressure value; and

b) introducing a second component of the coating agent into the chamber such that the pressure inside the chamber is at a second pressure value that is higher than the first pressure value.

21. (previously presented) The method of claim 20, further comprising:

pumping out the chamber before introducing the first or the second component of the coating agent into the chamber.

22. (previously presented) The method of claim 20, further comprising:

lowering the pressure inside the chamber to a value less than the first pressure value; and

repeating steps a) and b).

23. (previously presented) The method of claim 9, wherein the coating agent comprises an organosilane.

24. (previously presented) The method of claim 9, wherein the coating agent is an organochlorosilane.

25. (previously presented) The method of claim 9, wherein the coating agent is a halogen-substituted organochlorosilane.

26. (previously presented) The method of claim 9, wherein the coating agent comprises perfluoropolyether.

27. (previously presented) The method of claim 9 , wherein the coating agent is selected from a group comprising: a carboxylic acid material having the formula $CF_3(CF_2)_a(CH_2)_bCOOH$, wherein a is greater than or equal to 0, and b is greater than or equal to 0; a fluorocarbon material having the formula $C_nH_mF_{(2n+2-m)}$, wherein n is greater than or equal to 1, and m is greater than or equal to 0 and less than (2n+2); a fluorocarbon amine material having the formula $N(C_nH_mF_{(2n+1-m)})_3$ wherein n is greater than or equal to 1 and m is greater. than or equal to 0 and less than (2n+l); a fluorocarbon ether material having the formula $O(C_nH_mF_{(2n+1-m)})_2$ wherein n is greater than or equal to 1 and m is greater than or equal to 0 and less than (2n+l).

28. (previously presented) The method of claim 9, wherein the temperature in the chamber is from 60°C to 300°C.

29. (previously presented) The method of claim 9, wherein the temperature in the chamber is from 100°C to 200°C.

30. (previously presented) The method of claim 9, wherein the pressure in the chamber is from 1 Torr to 760 Torr.

31. (previously presented) A method for modifying a surface of a microelectromechanical device that is assembled within an assembly, the method comprising:

loading the assembly into a chamber;

preparing a gaseous modification agent; and

introducing the gaseous modification agent into the chamber such that the gaseous modification agent is delivered through a micro-opening of the assembly to the surface of

the microelectromechanical device for modifying the surfaces of the microelectromechanical device, wherein the micro-opening is between a first substrate and a second substrate that is glass having a reflective and deflectable mirror plate formed thereon; wherein the micro-opening has a characteristic dimension around 10 micrometers or less.

32. (original) The method of claim 31, wherein the gaseous modification agent comprises a cleaning agent that cleans the surface after being introduced onto the surface of the microelectromechanical device.

33. (original) The method of claim 32, wherein the cleaning agent comprises ozone gas.

34. (original) The method of claim 33, wherein the cleaning agent comprises an oxygen-containing co-agent.

35. (original) The method of claim 34, wherein the co-agent comprises vapor water.

36. (previously presented) The method of claim 32, wherein the step of introducing the gaseous modification agent into the chamber further comprises:

introducing the gaseous modification agent into the chamber; and

introducing a coating agent into the chamber such that the coating agent is delivered through the micro-opening to the surface for coating the surface of the microelectromechanical device.

37. (original) The method of claim 36, wherein the coating agent forms a layer that is chemically bonded to the surface of the microelectromechanical device.

38. (original) The method of claim 36, wherein the coating agent forms a layer that is physically adsorbed on the surface of the microelectromechanical device.

39. (original) The method of claim 36, wherein the coating agent comprises a first component and a second component, wherein the first component forms a layer that is chemically bonded to the surface of the microelectromechanical device, and the second component of forms another layer that is not chemically bonded to the surface of the microelectromechanical device.

40-42. (canceled)

43. (original) The method of claim 31, wherein the step of introducing the gaseous modification agent into the chamber further comprises:

a) introducing a first component of the modification agent into the chamber such that the pressure inside the chamber is at a first pressure value; and

b) introducing a second component of the modification agent into the chamber such that the pressure inside the chamber is at a second pressure value that is higher then the first pressure value.

44. (original) The method of claim 43, further comprising:

lowering the pressure inside the chamber to the first pressure or lower; and

repeating the steps a) and b).

45. (withdrawn) A method for modifying a surface of a microelectromechanical device, the method comprising:

assembling the microelectromechanical device into an assembly that comprises at least two substrates, one of which is opaque to ultra-violet light, wherein the assembly comprises a micro-opening between the two substrates;

placing the assembly on a supporting surface of a package substrate;

loading the package substrate with the assembly disposed thereon into a chamber;

preparing a gaseous modification agent;

introducing the gaseous modification agent into the chamber for modifying the surface of the microelectromechanical device by delivering the gaseous modification agent through the micro-opening of the assembly; and

wherein the temperature of the chamber is between 100° C and 200° C.

46. (withdrawn) The method of claim 45, wherein the step of introducing the gaseous modification agent into the chamber further comprises:

introducing the agent onto the surface through a micro-opening of the assembly, wherein the micro-opening has a characteristic dimension around 10 micrometers or less.

47. (withdrawn) The method of claim 45, further comprising:

a) introducing a first component of the agent into the chamber such that the pressure inside the chamber is at a first pressure value; and

b) introducing a second component of the agent into the chamber such that the pressure inside the chamber is at a second pressure value that is higher than the first pressure value.

48. (withdrawn) The method of claim 47, further comprising:

lowering the pressure inside the chamber to a pressure that is equal to or lower than the first pressure value; and

repeating the steps a) and b).

49. (withdrawn) The method of claim 45, wherein the modification agent is a cleaning agent for cleaning the surface of the microelectromechanical device.

50. (withdrawn) The method of claim 49, wherein the cleaning agent comprises ozone gas and vapor water.

51. (withdrawn) The method of claim 49, wherein the cleaning agent comprises ozone gas in the absence of water.

52. (withdrawn) The method of claim 45, wherein the modification agent comprises a coating agent for coating the surface of the microelectromechanical device.

53. (withdrawn) The method of claim 52, wherein the coating agent forms a layer that is chemically bonded to the surface of the microelectromechanical device.

54. (withdrawn) The method of claim 52, wherein the coating agent forms a layer that is physically adsorbed to the surface of the microelectromechanical device.

55. (withdrawn) The method of claim 52, wherein the coating agent comprises a first and second component, said first component being chemically bonded to the surface of the microelectromechanical device, and said second component being not chemically bonded to the surface of the microelectromechanical device.

56. (withdrawn) A method for modifying a surface of a microelectromechanical device in an assembly, the method comprising:

loading the assembly into a chamber; and

introducing a gaseous modification agent into the chamber such that the agent is delivered through an opening of the assembly to the surface of the microelectromechanical device, further comprising:

a) introducing a first component of the agent into the chamber at a first pressure; and

b) introducing a second component of the agent into the chamber at a second pressure that is higher than the first pressure.

57. (withdrawn) The method of claim 56, further comprising:

pumping out the chamber such that the pressure inside the chamber is equal to or less than the first pressure; and

repeating the steps a) and b).

58. (withdrawn) The method of claim 56, wherein the modification agent comprises a gaseous cleaning agent for cleaning the surface.

59. (withdrawn) The method of claim 58, wherein the first component of the cleaning agent comprises vapor water and ozone gas.

60. (withdrawn) The method of claim 58, wherein the second component of the cleaning agent comprises ozone gas in the absence of vapor water.

61. (withdrawn) The method of claim 56, wherein the modification agent comprises a coating agent for coating the surface.

62. (withdrawn) The method of claim 61, wherein the coating agent forms a layer that is chemically bonded to the surface of the microelectromechanical device.

63. (withdrawn) The method of claim 61, wherein the coating agent forms a layer that is physically adsorbed to the surface of the microelectromechanical device.

64. (withdrawn) The method of claim 61, wherein the coating agent comprises first and second component, said first component forming a layer that is chemically bonded to the surface, and said second component forming a layer that is not chemically bonded to the surface.

65-83. (canceled)

84. (previously presented) The method of claim 1, further comprising:

preparing a co-agent that comprises oxygen-containing molecules; and

introducing the co-agent into the chamber.

85. (previously presented) A method comprising:

loading a microelectromechanical device into a chamber;

introducing a first cleaning agent into the chamber for cleaning a surface of the microelectromechanical device in the chamber, wherein the chamber has a first pressure;

introducing a second cleaning agent into the chamber for cleaning the surface of the microelectromechanical device in the chamber, wherein the chamber has a second pressure that is different from the first pressure; and

wherein the method is performed in the absence of an application of ultraviolet light.

86. (previously presented) The method of claim 85, wherein the first cleaning agent comprises ozone gas.

87. (previously presented) The method of claim 85, wherein the second cleaning agent comprises ozone gas.

88. (previously presented) The method of claim 85, wherein the first and second cleaning agent both comprise ozone gas.

89. (previously presented) The method of claim 85, wherein the temperature of the chamber is between 100° C and 200° C.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.